1. (Currently Amended) A method to be used with a CT imaging system including a heart beat monitor that senses R-peaks and generates a heart beat signal including R-peak pulses where each R-peak pulse indicates a sensed peak heart cycle magnitude, the method for correcting for heart beat signal errors corresponding to data collected over the course of several heart cycles, the method comprising the steps of:

for each specific heart cycle where the specific heart cycle corresponds to a period between first and second R-peak pulses occurring at times t(1) and t(2), respectively:

identifying a heart rate;

using the heart rate to determine when an R-peak error has likely occurred; and

when an R-peak error has likely occurred, modifying the heart beat signal Rpeak pulse times by at least one of storing and eliminating at least one R-peak pulse;

wherein the step of using includes the step of determining when at least one undetected R-peak has likely occurred between times t(1) and t(2) and where the step of modifying includes, when at least one undetected R-peak has likely occurred, storing at least one estimated R-peak pulse time t(e) corresponding to the heart beat signal between times t(1) and t(2).

2. (Cancelled) The method of claim 1 wherein the step of using includes the step of determining when at least one undetected R-peak has likely occurred between times t(1) and t(2) and where the step of modifying includes, when at least one undetected R-peak has likely occurred, storing at least one estimated R-peak pulse time t(e) corresponding to the heart beat signal between times t(1) and t(2).

3. (Currently Amended) The method of claim ~~2~~ 1 wherein preceding cycles are heart cycles that precede the specific heart cycle and the step of using further includes the steps of identifying a moving average rate corresponding to the moving average heart rate of a sub-set of the preceding cycles and determining that

at least one undetected R-peak pulse has likely occurred between times t(1) and t(2) when the heart rate is less than Y% of the moving average rate.

4. (Original) The method of claim 3 further including the step of identifying a moving average period corresponding to the moving average heart cycle period of a sub-set of the preceding cycles and wherein the step of determining further includes the steps of identifying a preceding heart rate corresponding to at least one preceding heart cycle, identifying the estimated R-peak time t(e) as the time that precedes time t(2) by the moving average period, identifying an estimated heart rate corresponding to times t(e) and t(1) and determining that at least one undetected R-peak pulse has likely occurred between times t(1) and t(2) when the estimated heart rate is less than Z times the preceding heart rate.

5. (Previously Presented) The method of claim 4 further including the step of:

(a) determining when at least another undetected R-peak has likely occurred between times t(1) and t(2) ; and

(b) when at least another undetected R-peak has likely occurred, storing another estimated R-peak pulse time corresponding to the heart beat signal between times t(e) and t(1).

6. (Original) The method of claim 5 further including the step of repeating steps (a) and (b) until it is unlikely that another undetected R-peak pulse has occurred between times t(1) and t(2) .

7. (Original) The method of claim 5 wherein the step of determining when at least another undetected R-peak has likely occurred further includes the steps of identifying the next estimated R-peak time as the time that precedes the previous R-peak time corresponding to the most recently stored estimated R-peak pulse time by the moving average period, identifying an estimated heart rate

corresponding to the next estimated and previous R-peak times and determining that at least another R-peak pulse has likely occurred between times t(1) and t(2) when the estimated heart rate is less than Z times the preceding heart rate.

8. (Original) The method of claim 3 wherein the moving average rate is the average corresponding to the heart cycles that precede the specific heart cycle by four cycles, three cycles and two cycles and Y is 55.

9. (Original) The method of claim 4 wherein the moving average heart cycle period corresponds to the same heart cycle sub-set as the moving average heart rate.

10. (Original) The method of claim 4 wherein Z is 1.5 and the preceding heart rate corresponds to the heart cycle immediately preceding the specific heart cycle.

11. (Currently Amended) The method of claim ~~2~~ 1 further including the steps of:

using the heart rate to determine when the second Rpeak pulse at time t(2) is likely premature; and

when the second Rpeak pulse is likely premature, eliminating the second Rpeak pulse from the heart beat signal.

12. (Original) The method of claim 1 wherein the step of using includes the step of determining when the second Rpeak pulse at time t(2) is likely premature and, when the second Rpeak pulse time is likely premature, eliminating the second Rpeak pulse from the heart beat signal.

13. (Original) The method of claim 12 wherein preceding cycles are heart cycles that precede the specific heart cycle and, wherein, the step of using the heart rate to determine when the second Rpeak pulse time t(2) is likely premature

includes the step of identifying a moving average rate corresponding to the moving average heart rate of a sub-set of the preceding cycles and determining that the second Rpeak pulse time is likely premature when the heart rate is greater than X% of the moving average rate.

14. (Previously presented) The method of claim 13 further including the steps of, when a likely premature Rpeak pulse time is eliminated, determining if the eliminated pulse time was likely premature and, if the eliminated pulse was likely premature, storing an estimated Rpeak pulse time t(e) corresponding to the heart beat signal after times t(1).

15. (Original) The method of claim 14 wherein the heart beat signal includes a third Rpeak pulse at time t(3) where the third pulse follows second pulse corresponding to the specific heart cycle and, wherein, the step of determining if the eliminated pulse was likely premature includes identifying a heart rate corresponding to times t(1) and t(3) and determining that the eliminated pulse was likely premature when the heart rate is less than Y% of the moving average rate.

16. (Original) The method of claim 15 further including the step of identifying a moving average period corresponding to the moving average heart cycle period of a sub-set of the preceding cycles and wherein the step of determining if the eliminated pulse was likely premature further includes the steps of identifying a preceding heart rate corresponding to at least one preceding heart cycle, identifying the estimated R-peak time t(e) as the time that precedes time t(3) by the moving average period, identifying an estimated heart rate corresponding to times t(e) and t(1) and determining that the eliminated pulse was likely premature when the estimated heart rate is less than Z times the preceding heart rate.

17. (Currently amended) The method of claim ~~2~~ 1 wherein the step of storing includes ~~modifying~~ adding an R-peak pulse to the heart beat signal.

18. (Withdrawn) An apparatus to be used with a CT imaging system including a heart beat monitor that senses R-peaks and generates a heart beat signal including R-peak pulses where each R-peak pulse indicates a sensed peak heart cycle magnitude, the method for correcting for heart beat signal errors corresponding to data collected over the course of several heart cycles, the apparatus comprising:

a processor running a pulse sequencing program to perform the steps of:

for each specific heart cycle where the specific heart cycle corresponds to a period between first and second R-peak pulses occurring at times t(1) and t(2), respectively:

identifying a heart rate;

using the heart rate to determine when an R-peak error has likely occurred; and

when an R-peak error has likely occurred, modifying the heart beat signal to correct for the likely error.

19. (Withdrawn) The apparatus of claim 18 wherein the program causes the processor to perform the step of using by performing the step of determining when at least one undetected R-peak pulse has likely occurred between times t(1) and t(2) and to perform the step of modifying by, when at least one undetected R-peak has likely occurred, inserting at least one estimated R-peak pulse into the heart beat signal at an estimated time t(e) between times t(1) and t(2).

20. (Withdrawn) The apparatus of claim 19 wherein preceding cycles are heart cycles that precede the specific heart cycle and wherein the program causes the processor to perform the step of using by further performing the steps of identifying a moving average rate corresponding to the moving average heart rate of a sub-set of the preceding cycles and determining that at least one undetected R-peak pulse has likely occurred between times t(1) and t(2) when the heart rate is less than Y% of the moving average rate.

21. (Withdrawn) The apparatus of claim 20 wherein the program causes the processor to further perform the step of identifying a moving average period corresponding to the moving average heart cycle period of a sub-set of the preceding cycles and wherein the program causes the processor to perform the step of determining by further performing the steps of identifying a preceding heart rate corresponding to at least one preceding heart cycle, identifying the estimated R-peak time t(e) as the time that precedes time t(2) by the moving average period, identifying an estimated heart rate corresponding to times t(e) and t(1) and determining that at least one undetected R-peak pulse has likely occurred between times t(1) and t(2) when the estimated heart rate is less than Z times the preceding heart rate.

22. (Withdrawn) The apparatus of claim 19 further including the steps of:

using the heart rate to determine when the second Rpeak pulse at time t(2) is likely premature; and

when the second Rpeak pulse time is likely premature, eliminating the second Rpeak pulse from the heart beat signal.

23. (Original) A method to be used with a CT imaging system including a heart beat monitor and a data acquisition system, the acquisition system used to collect CT data during a period ending at a time t(end), the monitor sensing R-peaks and generating a heart beat signal including R-peak pulses where each R-peak pulse indicates a heart beat and the last Rpeak pulse occurs at time t(N), the method for correcting for heart beat signal errors corresponding to data collected over the course of several heart cycles, the method comprising the steps of:

determining when time t(N) precedes time t(end);

where time t(N) precedes time t(end), identifying a moving average heart cycle period corresponding to a sub-set of signal cycles that precede the cycle ending at time t(N);

adding additional Rpeak times to the end of the heart beat signal until the last

additional time follows time t(end) where each additional time follows the preceding Rpeak time by the moving average.

24. (Original) The method of claim 23 wherein the period ending at time t(N) is an Nth cycle and the moving average period is determined by averaging the cycle periods for the N-5th through N-2nd cycles.